# Arthroscopic Shoulder Stabilization and Rehabilitation

Surgical Indications and Considerations

*Anatomical Considerations*: The concave surface of the glenoid is relatively less concave, and only 1/3 the size of the articulating surface of the much larger, more convex humeral head. However, the glenoid labrum accounts for the difference in concavity. In conjunction with the static and dynamic stabilizers of the shoulder, the labrum enables proper articulation to be possible in the non-pathologic shoulder, making up the difference between concavity/convexity of the glenoid and humeral head. However, when the stabilizing mechanisms of the joint are not sufficient, anatomic fit is compromised, causing excessive wear and tear on the joint, often resulting in pain with activity.

*Pathogenesis*: While a certain amount of tissue laxity is required for proper articulation, a breakdown at any level: labral, static and/or dynamic stabilization, can result in excessive/pathologic laxity, termed *instability*. Breakdown at any level, static or dynamic, will place undue stress on the other, and lend itself toward more global effects. Resultant instability is often symptomatic by shoulder pain/discomfort with motions that cause excessive accessory joint motion.

*Epidemiology*: While most common in overhead athletes and swimmers, glenohumeral capsular instability is not widely common/problematic among the general public. Among those affected, most are male. 86% male vs. 14% female.

*Diagnosis/Indications for Surgery*

- Recurrent shoulder subluxation/dislocation
- Acute traumatic dislocation
- Pain or symptom associated with the above conditions.

*Nonoperative Versus Operative Management*: Conservative management of shoulder instability consists of strengthening for the dynamic stabilizers of the shoulder in effort to compensate for laxity in the static stabilizers. Dynamic stabilization of the rotator cuff and scapular stabilizers can sufficiently achieve glenohumeral stability for everyday activities in most patients. In those who participate in a high level of overhead activity, however (throwers, swimmers, etc.) surgical intervention may be required for future return to sport. However, from the physical therapist's perspective, rehabilitation is quite similar for operative vs. nonoperative patients. Furthermore, there is no urgent need for surgical intervention to be immediate. In fact, most patient cases are those of chronic instability to begin with. Therefore, conservative management is often tried first, before resorting to surgical intervention when the instability is not related to rotator cuff or labral tears.

*Surgical Procedure*: Among the newest and increasingly more common ways to increase shoulder stability is thermal-assisted capsular shrinkage. This is a process by which laser or

radio-frequency sound waves are used to heat collagen tissues to temperatures above 60°C at which the collagen helix begins to unwind and cause resultant tissue shrinkage. This is a simple, yet very precise procedure in the sense that if the tissue is heated too rapidly, or too far, the desired effect is lost and tissue necrosis results instead. Due to the repetitive nature of the injuries that cause patients to require such a procedure, the majority of them (90%) have other reparative surgical procedures simultaneously with capsullorhaphy. Most commonly these include surgical repair and/or debridement of the labrum and/or rotator cuff as well as capsular suture repair in addition to laser. Even with that being the case, 87% of overhead athletes who undergo this procedure successfully return to competitive sport.

Preoperative Rehabilitation

- None required
- May include dynamic stabilization in attempt to manage nonoperatively.

## POSTOPERATIVE REHABILITATION

The greatest factor in post-operative rehabilitation is whether the patient's shoulder instability is an acquired condition, or a congenital state of laxity, possibly worsened by lifestyle or activity. Those born inherently "loose" are most prone to capsular creep and thus eventual failure of the procedure, so their rehabilitation must be much more conservative so as to avoid any stretching to the capsular structures, especially during the critical early stages after surgery – when the collagen is most susceptible to stretch. Patients whose laxity is an acquired condition may be advanced more quickly. Acquired or congenital instability can be determined by examination of the uninvolved shoulder.

Other considerations: Individuals prone to scar tissue deposition must be advanced through their rehabilitation more aggressively to prevent development of excessive capsular scarring and subsequent loss of range of motion (ie: frozen shoulder). For this reason, tissue end feel should be re-assessed on a weekly basis for all individuals post-surgery. Stretchy end feels indicate conservative treatment. Stiffer end feels indicate the need for more aggressive rehabilitation with stretching to maintain/gain range of motion as required.

Note: The following rehabilitation progression is a synopsis of the guidelines provided by Wilk, Reinold, Dugas, and Andrews. Refer to their publication for details regarding how to apply the progression effectively to individual patients.

**Phase I** for individuals with *Acquired* Laxity: Weeks 1-6 (Protection Phase)

Goals: Tissue healing
Minimize pain and inflammation
Initiate protected motion
Retard muscular atrophy

Weeks 0-2:

- Sling use for 14 days
- Wrist, elbow, and cervical ROM exercises
- Passive and active-assisted shoulder ROM (no aggressive stretching)
- Shoulder isometrics and rhythmic stabilization (7 days)

Weeks 3-4:

- Begin AROM at week 3, add 1 pound at week 4.
- Emphasize strength of ER and scapular stabilization.

Weeks 5-6:

- Progress ROM to:
  - Elevation to $160^{o}$
  - ER at $90^{o}$ ABD ($75\text{-}80^{o}$)
  - IR at $90^{o}$ ABD ($60\text{-}65^{o}$)
- Initiate Thrower's Ten strengthening program

**Phase II** for individuals with *Acquired* Laxity: Weeks 7-12 (Intermediate Phase)

Goals: Restore full ROM (week 8)
Restore functional ROM (weeks 10-11)
Normalize arthrokinematics
Improve dynamic stability, muscular strength

Weeks 7-8:

- Progress ROM
  - Elevation $180^{o}$
  - ER $90\text{-}100^{o}$
  - IR $60\text{-}65^{o}$
- May be more aggressive with ROM progression and stretching
- May perform joint mobilization
- Continue strengthening as above (Thrower's Ten, dynamic stab, rhythmic stab)
- Initiate plyometrics (2-handed drills)

Weeks 9-12:

- Progress ROM to specific athletic demand
  - ER $110\text{-}115^{o}$
- Generalized stretching
- Strengthening
  - Continue as above, with progressive resistance
  - Push-ups
  - Bench press (do not allow arm below body)
  - Single handed plyometric throwing
  - Plyoball wall drills

**Phase III** for individuals with *Acquired* Laxity: Weeks 12-20 (Advanced Activity and Strengthening Phase)

Goals: Improve strength, power, and endurance
Enhance neuromuscular control
Functional activities

Weeks 12-16:

- Continue stretching/strengthening as above

Weeks 16-22

- May resume normal training program

**Phase IV** for individuals with *Acquired* Laxity: Weeks 26 (Return to Activity Phase)

Goals: Gradual return to unrestricted activities
Maintain static and dynamic stability of shoulder joint

Criteria: Full functional ROM
No pain or tenderness
Satisfactory muscular strength
Satisfactory clinical exam

**Phase I** for individuals with *Congenital* Instability: Weeks 0-8 (Protection Phase)

Goals: Allow healing of tightened capsule
Begin early protected motion of elbow, wrist and hand
Decrease pain and inflammation
Gradual increase in ROM after week 3

Weeks 0-2

- Active abduction after 10 days, but not to exceed $70^{o}$
- Sleep in slign x 2 weeks
- No overhead activity for 12 weeks

Weeks 2-4

- Pulley exercises (to $90^{o}$)
- Isometric strengthening
- Rhythmic stabilization

Weeks 4-6

- ROM exercises with cane
    - Flexion to $125^{o}$
    - ER to $25^{o}$
    - IR to $45^{o}$
- Continue strengthening as above
    - Add theratubing at week 5
- Gentle mobilization to reestablish normal arthrokinematics

**Phase II** for individuals with *Congenital* Instability: Weeks 6-12 (Intermediate Phase)

Goals: Full nonpainful ROM at weeks 10-12
Normalize arthrokinematics
Increase strength
Improve neuromuscular control

Weeks 6-12

- Gradually progress to 80% of full ROM
- Isotonic dumbbell/tubing program – basic rotator cuff and scapular strengthening program
- Neuromuscular control exercises for scapulothoracic joint
- Joint mobilization and self-capsular stretching after week 8

**Phase III** for individuals with *Congenital* Instability: Weeks 12-20 (Dynamic Strengthening Phase)

Goals: Improve strength, power, and endurance
Improve neuromuscular control
Prepare the athlete to begin to throw

Exercises
- Continue strengthening as above
- Gradually return to recreational activity

**Phase IV** for individuals with *Congenital* Instability: Weeks 20-28 (Return to Activity Phase)

Goals: Progressively increase activities to prepare patient for full functional return

Criteria:
- Full range of motion
- No pain or tenderness
- Isokinetic test that fulfills criteria
- Satisfactory clinical exam

Exercises:
- Continue strengthening
- Emphasize closed kinetic chain
- Initiate recreational sport (physician clearance required)

Selected References:

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